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Th2A.30 - from the session Joint Poster Session II (Th2A)

Orchestrating Lightpath Adaptation and Flexible Functional Split to Recover Virtualized RAN Connectivity

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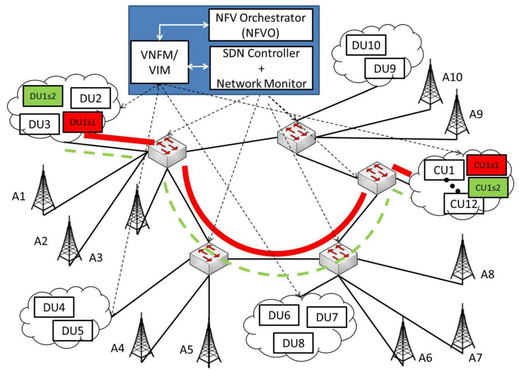
Issue

Parameters	Example
Metro area	Milan (200 km^2)
Num. cell sites	100
Cell density	0.5/km^2
Functional split	Option 2
Req. fronthaul (FH) capacity per site	~4 Gb/s per direction (UL/DL)
Overall req. FH capacity	~1Tb/s



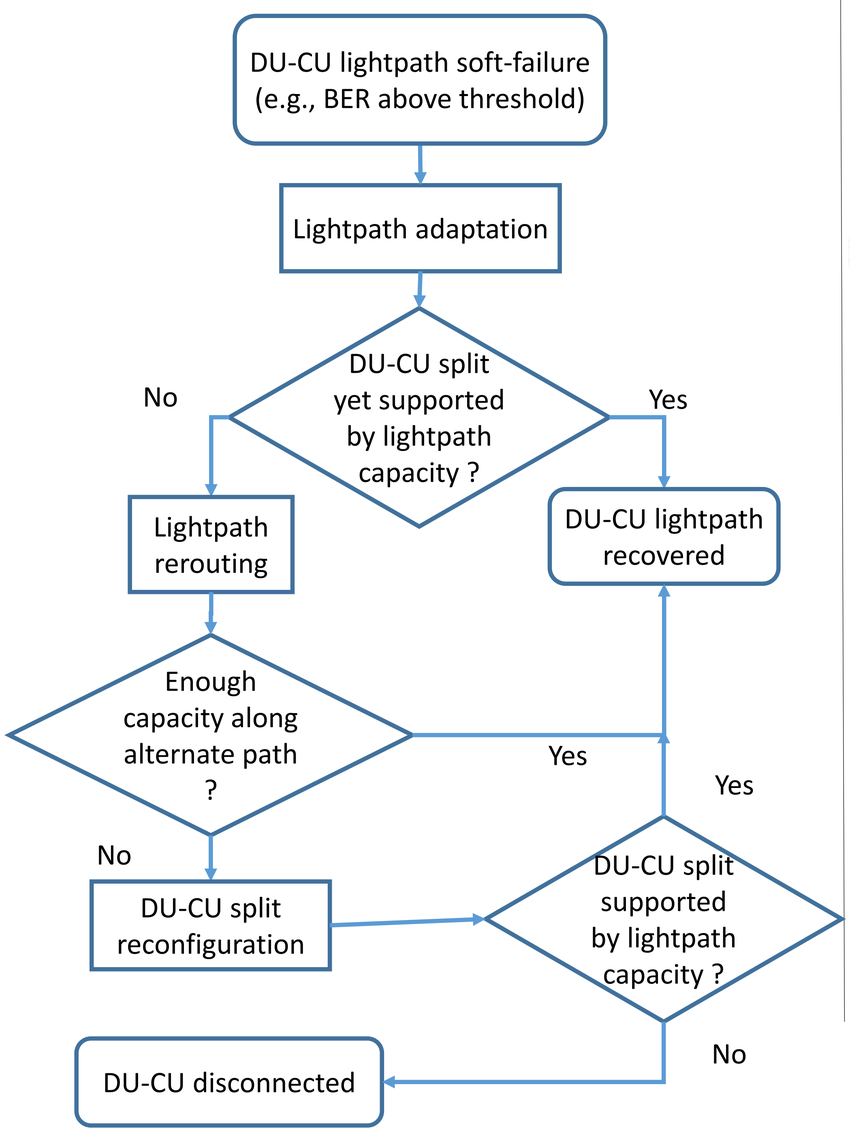
Fronthaul (i.e., lightpath) failures

- **Soft failures (e.g., BER increase)** → Soft failure recovery → Lightpath transmission adaptation (e.g., modulation format change, Increased code redundancy)
- Hard failures (e.g., fiber cut) → Lightpath rerouting → Blocking → Fronthaul permanent failure

Lightpath transmission adaptation (e.g., modulation format change, Increased code redundancy) → Reduced lightpath (i.e., virtual link) capacity → Fronthaul requested capacity unavailability

Solution

Objective: recovering DU-CU connectivity even when optical network resources are scarce and lightpath rerouting is not possible (DU=distributed unit, CU=central unit)

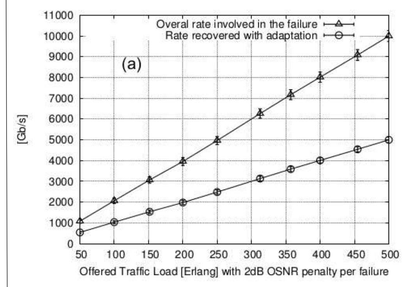


Results

SIMULATIONS

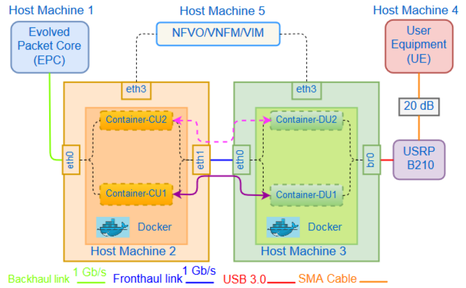
Performance metric: amount of traffic recovered by transmission adaptation (no re-routing)

Simulation scenario: 5-node ring, 10 km per link, Poisson traffic (λ variable, μ=5000s), transponders support 200 Gb/s
PM-16QAM and 100 Gb/s PM-QPSK, BER threshold= 10^{-3} soft failure penalty=2dB



EXPERIMENTS

Performance metric: eNB functional split reconfiguration time (FSRT), time elapsing between functional split reconfiguration start and end



Experiment scenario:
Option8 and Option 7a, Docker container virtualizaton, FSRT measured through periodic pings (1ms)